Installation
Operation and Service Manual

TEMPERATURE SURVEILLANCE MODULE

MODEL NUMBER T100-1 & T100-3

WITH SELF TEST FEATURE

Manual No. 090193

GENERAL INFORMATION

JEWETT TEMPERATURE SURVEILLANCE MODULE

Start Up Procedures for the Jewett T100-1 and T100-3 Surveillance Module

Now that your BBR Blood Bank Refrigerator or BPL Blood Plasma Freezer is set in place and in operation, the following items should be accomplished to place the T100 Module in operation.

1. Fill the upper and lower solution bottles to within 1" of the top with the proper solution:
   BBR Series - 10% Glycerine in water
   BPL Series - 50% Glycol Base Antifreeze in water
   The probes should be placed back into the bottles ensuring that the lower 4" of the probes are completely immersed.

2. Connect the back-up battery (9 volt) to the module. The battery is located in a holder on the top of the dust cover on the back of the surveillance module.

3. After 24 hours of operation, the surveillance module should be checked for proper operation. By using this manual as a guide, operate the various functions. This will not only ensure proper operation, but will also familiarize you and your staff with it's correct operation.

The Jewett Self Test Temperature/Power Surveillance Module is a sophisticated precision electronic instrument. Its primary purpose is to assure the user of stored product safety. The module is designed to be a separate and distinct system which operates and functions independently from the refrigeration control system.

SEVEN BASIC FUNCTIONS PERFORMED BY THE MODULE

1. High/Low Temperature Self Test Feature
2. Calibration Check for Digital Display Accuracy.
3. Monitoring of Temperature With or Without the Presence of AC Power
4. Constant 24 Hour Surveillance of Temperature Within the Refrigerator or Freezer Cabinet.
5. Constant Display of the Upper Solution (or Product) Temperature With Provision for the User to Select and Momentarily Display the Lower Solution (or Product) Temperature.
6. A Door Ajar Status Indicator Light and Audible Signal.
7. Low Back-Up Battery Indicator Light and Audible Signal.

OPERATION OF THE MODULE

Page 2 of this manual illustrates and identifies the location of various operational functions.
The module face panel is divided into two sections, Display and Monitor. The following paragraphs describe the indications and functions that take place in these sections.

DISPLAY SECTION

The digital display indicates the temperature of the upper solution within the refrigerated cabinet when the green upper solution LED is illuminated. To display the lower solution temperature, depress the lower solution selection Touch Pad Switch momentarily. The instrument now senses and displays the lower solution for a period of 4 seconds. The display will automatically return to display of the upper solution temperature.

The Alarm Test Function - The high alarm is activated by depressing and releasing the High Alarm Touch Pad Switch. The temperature will rise until the module reaches the High Activation Temperature (T100-1, +5.5°C., T100-3, -20°C.). The low alarm is activated by depressing and releasing the Low Alarm Touch Pad Switch. The temperature will fall until the module reaches the Low Activation Temperature (T100-1, +1.5°C.). The temperature display will return to normal operating temperature once the alarm point is achieved.

The Calibration Function - By depressing the Calibration Touch Pad Switch, the digital will display the following: T100-1 (10°C.), T100-3 (-20°C.). If the display is more than .2 + or - off, see page 4 for calibration instructions.

MONITOR SECTION

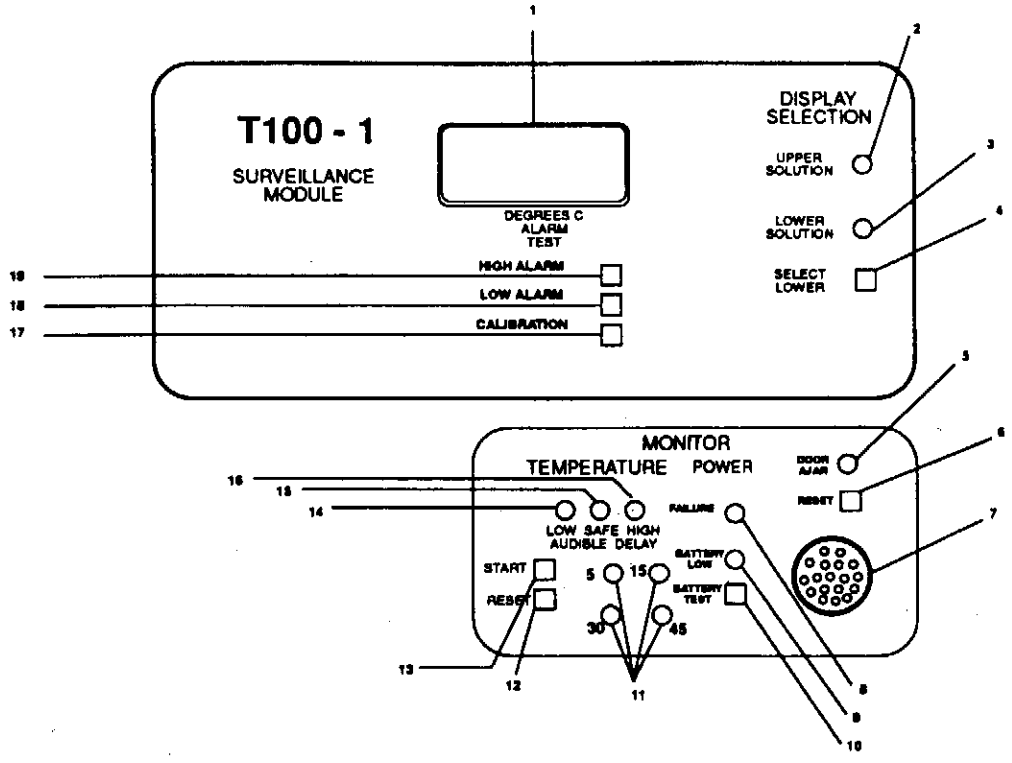
The Temperature Section - Monitors the temperature of the upper solution within the refrigerator or freezer cabinet and presence or absence of AC primary power. During a primary (AC) power failure, the digital display will extinguish, the appropriate temperature LED will be illuminated, and a pulsating audible will be present.

The Audible Delay Section - Consists of a Start Touch Pad Switch, Reset Touch Pad Switch and four green LED Lamps designating 5, 15, 30 or 45 minutes. To silence an audible signal depress the start switch once and the 5 minute LED Lamp will illuminate and a 5 minute silence period will begin. A longer silence period may be selected by once again depressing the start switch. The silence period can also be selected by depressing the start switch and holding it down until the desired silence period is obtained. The selected silence period can also be cancelled by depressing the reset switch.

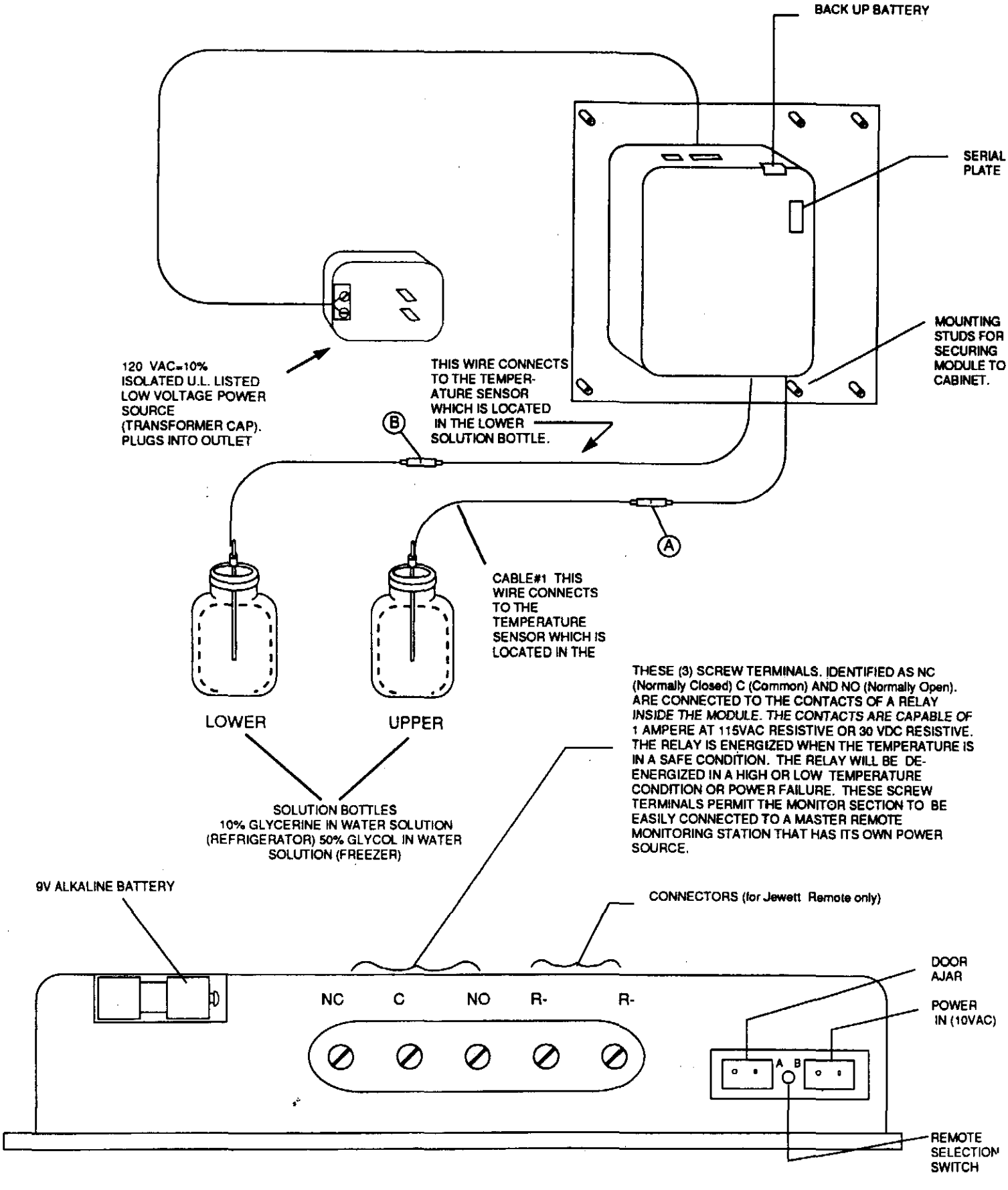
The Power Section - Consists of a red Power Failure LED, a red Battery Low LED, and a Battery Test Touch Pad Switch. During an AC Power Failure, the failure LED will be illuminated and a pulsating audible signal will be present. If the back-up battery power becomes low (7.0 VDC measured under load), the Low Battery LED will flash and an audible signal will be present. To check the battery, depress the Battery Test Touch Pad Switch, this will simulate an AC power failure. During this test the digital display will extinguish, the appropriate temperature LED will be illuminated, the power failure LED and a pulsating audible will be present.

Upon the completion of the Battery Test Function,, momentary display of -88.8 on the digital display, and every LED will illuminate for approximately 1 second. This will ensure that all LED's on the face and all segments of the digital display will illuminate.

The Door Ajar Section - Consists of a red LED Door Ajar lamp, and a Reset Touch Pad Switch. When the refrigerator (or freezer) door is properly closed, no indication is present. Whenever the door is intentionally or unintentionally open (ajar) the red LED Door Ajar lamp will flash. If the door remains open for approximately three (3) minutes (+ or - 30 seconds), a pulsating audible signal will be heard. If the Door Ajar alarm condition is not corrected and the temperature of the upper solution reaches 4.5° C., a signal will be sent to the remote location monitor where applicable. If it is necessary for the door to remain open after the audible signal sounds, depress the Door Ajar Reset Touch Pad Switch and the audible will be silenced for an additional three minutes.



1. Digital Display — Displays temperature in degrees C., as measured by the selected temperature sensor.
2. Upper Solution LED — When green LED is illuminated the digital display provides a reading from the sensor in the upper solution bottle.
3. Lower Solution LED — When this green LED is illuminated the digital display provides a reading from the sensor in the lower solution bottle.
4. Lower Solution Touch Pad Selection Switch — This switch when pressed is used to momentarily display a reading of solution temperature in the lower section of the refrigerator or freezer.
5. Door Ajar LED — This red LED will flash whenever the door is open or ajar (not completely closed.)
6. Door Ajar Reset Touch Pad Switch — This switch when pressed will silence the door ajar timer to provide an additional silence period (3 minutes) before the audible signal operates again.
7. Audible signal source — This device will provide a continuous sound when the temperature in the upper solution exceeds the upper (T100-1 5,5° C.,) T100-3 -20° C.) or lower (T100-1 only 1.5° C.) limits or a pulsing sound when there is an AC power failure, low voltage in the back up battery or when the door ajar feature is activated.
8. Power Failure LED — This red LED will flash if the AC power fails or when the battery test switch is pressed.
9. Battery Low LED — This red LED will flash when the battery voltage drops below 7 VDC.
10. Battery Test Touch Pad Switch — When this switch is pressed all display indication is extinguished except the appropriate temperature indicator LED and the power failure LED.
11. Audible Silence Time Selection LED's — These LED's when illuminated indicate audible time period selected (5, 15, 30 or 45 minutes). When the time period expires the LED will extinguish.
12. Audible Reset Touch Pad Switch — This switch when pressed will cancel the time period that was previously selected,
13. Audible Silence Touch Pad Selection Switch — To silence the audible sound press the switch until the desired green LED is illuminated indicating 5, 15, 30 or 45 minutes.
14. Temperature Low LED (T100 -1 only) — When the red LED is illuminated the temperature in the upper solution bottle is below 1.5° C.
15. Temperature Safe LED — When this green LED is illuminated the temperature in the upper solution bottle is in the safe range.
16. Temperature High LED — When the red LED is illuminated the temperature in the upper solution bottle is above 5.5° C. (T100 -3 at- 20 ° C.).
17. Calibration Touch Pad Switch — When this switch is pressed the digital will display the following: T100-1 10.0
18. Low Alarm Touch Pad Test Switch (T100-1 only) — When this switch is pushed and released the alarm sensor in the upper solution bottle will be cooled until the temperature reaches the alarm point of +1.5°C. At this time the audible sound and the low temperature LED are activated. Once the alarm point is achieved the module will return to normal operation.
19. High Alarm Touch Pad Test Switch — When this switch is pushed and released the alarm sensor in the upper solution bottle is warmed until the temperature reaches the alarm point (T100-1, +5.5°C., T100-3, -20°C.). At this time the audible sound and the high temperature LED are activated. Once the alarm point is achieved the module will return to normal operation.



TOP VIEW

POSITION A FOR USE WITH DTPMR OR TPMR

POSITION B FOR USE WITH DTPMR OR TMSRB

T100-1 & T100-3

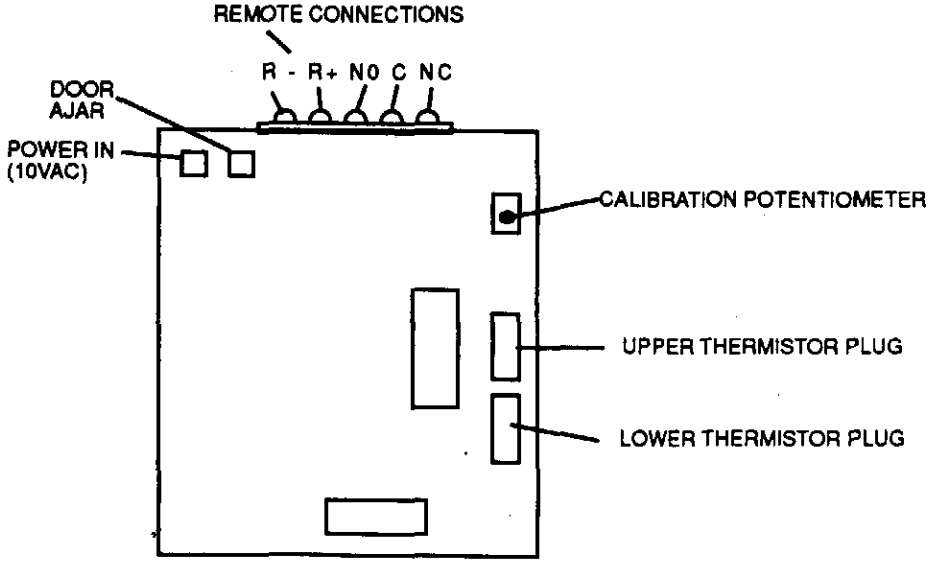
DISPLAY CALIBRATION PROCEDURE

1) ALLOW T100 TO OPERATE FOR A MINIMUM OF 30 MINUTES.

2) DISCONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY. REMOVE FOUR SCREWS ON BACK OF COVER AND REMOVE COVER. RECONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY.

3) PRESS AND HOLD THE CALIBRATION TOUCH PAD SWITCH WHILE ADJUSTING THE CALIBRATION POTENTIOMETER. ADJUST TO 10.0 (T100-1) OR -20.0 (T100-3).

4) DISCONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY. REPLACE REAR COVER. CALIBRATION IS NOW COMPLETE. RECONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY.



REAR VIEW (COVER REMOVED)

JEWETT T100-1 & T100-3 (SELF TEST) PARTS LIST

PARTS DESCRIPTION	QUANTITY REQUIRED	JEWETT PART #
Front Panel T100-1	1	MOD-D0026
Front Panel T100-3	1	MOD-D0027
Dust Cover	1	MOD-0028
Main Board Assembly T100-1	1	MOD-D0029
Main Board Assembly T100-3	1	MOD-D0030
Thermistor Assembly Upper (T100-1)	1	MOD-D0031
Thermistor Assembly Upper (T100-3)	1	MOD-D0032
Thermistor Assembly Lower (T100-1 & 3)	1	MOD-D0008
Thermistor Cable Assembly Upper	1	MOD-D0033
Thermistor Cable Assembly lower	1	MOD-D0009
Audible Device Assembly	1	MOD-D0006
Door Ajar Plug Assembly	1	MOD-D0010
Power Supply Assembly	1	MOD-D0011
Battery Bracket	1	MOD-D0014
Battery 9V (Alkaline)	1	Available at Retail Outlets

DIGITAL DISPLAY SECTION

	Digital Display	Upper Solution LED	Lower Solution LED	Lower Solution Switch	Possible Cause	Suggested Repair
1	Reading Correct	On	Off	Pressed Momentarily	Switch or Circuit Malfuntion	Replace Switch or Contact Jewett Service
2	Reading Correct	Off	Off	Not Pressed	Upper LED or Circuit Malfunction	Replace LED or contact Jewett Service
3	Reading Correct	Off	Off	Pressed Momentarily	Lower LED or Circuit Malfunction	Replace LED or contact Jewett Service
4	Reading Correct	On	On	Pressed or not Pressed	Circuit Malfunction	Contact Jewett Service
5	Reading Correct	Off	On but recycles to upper LED immediately	Pressed Momentarily	Circuit Malfunction	Contact Jewett Service
6	Reading Incorrect	On	Off	Not Pressed	Upper Solution Thermistor Sensor or circuit malfuntion	Check Calibration, Replace Sensor or contact Jewett Service
7	Reading Incorrect	Off	On	Pressed Momentarily	Lower Solution Thermistor Sensor or Circuit malfunction	Check Calibration, Replace Sensor or contact Jewett Service
8	Reading -12.6°	On	Off	Not Pressed	Upper Solution Sensor Disconnect or open Circuit	Connect Sensor or contact Jewett Service
9	Reading -12.6°	Off	On	Pressed Momentarily	Lower Solution Sensor Disconnected or circuit malfunction	Connect Sensor or contact Jewett Service
10	Off	On	Off	Not Pressed	Digital Meter Malfunction	Contact Jewett Service
11	Off	Off	On	Pressed Momentarily	Digital Meter Malfunction	Contact Jewett Service
12	(T100-1) Reading Minus Temp.	On	Off	Not Pressed	Check actual Temp. of Solution, or circuit malfunction	Correct Solution Temperature or contact Jewett Service
13	(T100-1) Reading Minus Temp.	Off	On	Pressed Momentarily	Check actual Temp. of Solution, or circuit malfunction	Correct Solution Temperature or contact Jewett Service
14	Any Missing Segment.	On	Off	Not Pressed	Meter Malfunction	Contact Jewett Service
15	Any Missing Segment.	Off	On	Pressed Momentarily	Meter Malfunction	Contact Jewett Service

DIGITAL DISPLAY SECTION (SELF TEST)

	Digital Display	High Alarm Test Switch	Low Alarm Test Switch	Calibration Switch	Possible Cause	Suggested Repair
1	Reading Not Rising	Pressed	Not Pressed	Not Pressed	Switch, upper solution sensor or circuit malfunction	Replace Switch or replace the sensor, or contact Jewett Service.
2	Reading Not Falling	Not Pressed	Pressed	Not Pressed	Switch, upper solution sensor or circuit malfunction	Replace Switch or replace the sensor, or contact Jewett Service.
3	Reading Incorrect	Not Pressed	Not Pressed	Pressed	Switch, or circuit malfunction	Replace Switch or contact Jewett Service.
4	Reading Incorrect	Not Pressed	Not Pressed	Pressed	Out of Calibration, or circuit malfunction	Recalibrate per instruction manual or contact Jewett Service.

DOOR AJAR FUNCTION

	Door Ajar LED	Reset Switch	Audible Device	Door Status	Possible Cause	Suggested Repair
1	Flashing	Not Pressed	Pulses at the proper time	Closed	Door switch, circuit malfunction	Replace door switch or contact Jewett Service.
2	On Constant	Not Pressed	Off	Open	circuit malfunction	contact Jewett Service.
3	On Constant	Not Pressed	On Constant	Open	circuit malfunction	contact Jewett Service.
4	Flashing	Not Pressed	Off Never Pulses	Open	circuit malfunction	contact Jewett Service.
5	Flashing	Not Pressed	On Immediately No Delay	Open	circuit malfunction	contact Jewett Service.
6	Off	Not Pressed	Off Never Pulses	Open	Door switch, door switch wiring, circuit malfunction.	Replace switch, check wiring connections or contact Jewett Service.
7	Off	Not Pressed	Pulses at the proper time	Open	LED lamp or circuit malfunction	Replace LED lamp or contact Jewett Service.

AUDIBLE SECTION

Temperature				Power	Battery		Audible Section							Possible Cause	Suggested Repair
Cabinet	Low LED	Safe LED	High LED	Fail-LED	Test Switch	Low LED	Start	Reset	Sound	5	15 (minutes	30 - LED)	45		
High or Low	on	off	on	off	off	off	Pressed	Not Pressed	on	on	on or off	on or off	on or off	Circuit Malfunction	Contact Jewett Service
High or Low	on	off	on	off	off	off	Pressed	Not Pressed	on	off	off	off	off	Start Switch failure, or circuit malfunction	Replace Start Switch or Contact Jewett Service
High or Low	on	off	on	off	off	off	Pressed	Not Pressed	off	off	off	off	off	Selected time LED failure, or circuit malfunction	Replace LED'S or Contact Jewett Service
Safe	off	on	off	off	off	off	Not Pressed	Pressed	off	on	on or	on or	on or	Reset switch failure, or circuit malfunction	Replace reset switch or Contact Jewett Service

POWER SECTION

Temperature				Power	Battery		Audible Section							Possible Cause	Suggested Repair
Cabinet	Low LED	Safe LED	High LED	Fail-LED	Test Switch	Low LED	Start	Reset	Sound	5	15 (minutes	30 - LED)	45		
Safe	off	on	off	off	Not Pressed	off	Not Pressed	Not Pressed	off	off	off	off	off	Normal Operation	None
High or Low	on	off	on	off	Not Pressed	off	Pressed	Not Pressed	on	on	off	off	off	Circuit malfunction	Contact Jewett Service
High or Low	on	off	on	off	Not Pressed	off	Pressed	Not Pressed	on	off	on	off	off	Circuit malfunction	Contact Jewett Service

Temperature				Power	Battery		Audible Section								
Cabinet	Low LED	Safe LED	High LED	Fail-LED	Test Switch	Low LED	Start	Reset	Sound	5	15 (minutes - LED)	30	45	Possible Cause	Suggested Repair
High or Low	on	off	on	off	Not Pressed	off	Pressed	Not Pressed	on	off	off	on	off	Circuit malfunction	Contact Jewett Service
High or Low	on	off	on	off	Not Pressed	off	Pressed	Not Pressed	on	off	off	off	on	Circuit malfunction	Contact Jewett Service
High or Low	on	off	on	off	Not Pressed	off	Pressed	Not Pressed	off	off	off	off	off	Start switch failure or Circuit malfunction	Replace switch or Contact Jewett Service
Safe	off	on	off	off	Not Pressed	off	Not Pressed	Pressed	on	on	off	off	off	Reset switch failure or circuit malfunction	Replace switch or contact Jewett Service
Safe	off	on	off	off	Not Pressed	off	Not Pressed	Pressed	off	off	on	off	off	Reset switch failure or circuit malfunction	Replace switch or contact Jewett Service
Safe	off	on	off	off	Not Pressed	off	Not Pressed	Pressed	off	off	off	on	off	Reset switch failure or circuit malfunction	Replace switch or contact Jewett Service
Safe	off	on	off	off	Not Pressed	off	Not Pressed	Pressed	off	off	off	off	on	Reset switch failure or circuit malfunction	Replace switch or contact Jewett Service
Safe	off	on	off	Flashing	Not Pressed	off	Not Pressed	Not Pressed	on	off	off	off	off	AC power failure or circuit malfunction	Check power source, change transformer cap or contact Jewett Service
Safe	off	on	off	Flashing	Pressed	off	Not Pressed	Not Pressed	on	off	off	off	off	Simulated power failure	Normal Operation
Safe	off	on	off	off	Not Pressed	on	Not Pressed	Not Pressed	on	off	off	off	off	Battery low (below 7 VDC under load) or circuit malfunction	Replace battery or contact Jewett Service

REMOTE TERMINALS (SWITCH POSITION A)

+ / - Terminal	Temp. Condition	Ac Power LED Failure	Door Ajar	Possible Cause	Suggested Repair
5.25 VDC	Safe	Off	Off	Normal	Non Required
4.75 VDC	Low	Off	Off	Normal	Non Required
5.63 VDC	High	Off	Off	Normal	Non Required
3.26-5.25 VDC	Safe	On	Off	Normal	Non Required
3.29-5.25 VDC	Safe 4.5° C. or above	Off	On	Normal	Non Required
		REMOTE TERMINALS (SWITCH POSITION B)			
+5 VDC	Safe	Off	Off	Normal	Non Required
0	High or Low	Off	Off	Normal	Non required
0	Safe	On	Off	Normal	Non Required
+5 VDC	Safe	Off	Flashing	Normal	Non Required
0	Safe 4.5° C. or above	Off	Flashing	Normal	Non Required

REMOTE TERMINALS NO, NC AND C

Jewett T100 Series Monitors include as standard equipment three external terminals which are Common, the Normally Open and the Normally Closed dry contacts of a Hermetically sealed relay. The relay is energized when all conditions are safe and de-energized when any unsafe condition occurs. The current-carrying capability of this relay is 1 amp at 115 volt AC and 1 amp (resistive) at 28 VDC.

Suggested Quality Control Procedure For Jewett Temperature Monitoring Equipment

Surveillance Modules & Temperature/Power Monitors should be tested for both low and high temperature activation, where applicable, on a regular basis. If additional wire is required to move the upper solution thermistor sensor to the outside of the refrigerator or freezer, there is approximately 4' of wire stored in the compressor compartment (T100 Series only).

Procedure

Always check the low activation first.

1. Low Alarm Activation (+1.5C Where Applicable)
   a. Fill an 8 ounce glass half full of chilled water (4°C).
   b. Crush ice to 1/8" particles in a seperate container.
   c. Remove the sensor from the upper solution bottle, tape this sensor to the test thermometer (NBS Certified) then insert into the glass.
   d. Slowly add crushed ice at the proper rate to provide a temperature drop of 0.5° C/minute (approximately 1 teaspoonful every 15 to 25 seconds).
   e. Stir the test thermometer/monitor sensor constantly in a circular motion, keeping the ends in the lower liquid, not the upper ice slurry.
   f. Log the low alarm activation.

2. High Alarm Activation (5.5° C or -20° C)
   a. 5.5° C-slowly add warm water to the ice slurry at the proper rate to provide a temperature rise of 0.5° C/min. 20° C slowly add warm water to container of pre-cooled antifreeze solution (-30° C) at the proper rate to provide a temperature rise of 0.5° C/min.
   b. Constantly stir the test thermometer/monitor sensor as in Step "e" above.
   c. Log high alarm activation.

3. Check and log reaction of remote monitor during these test procedures if applicable.

4. The rate of rise and fall of the liquid bottle temperature used in testing is critical. Observe the 0.5° C/minute rate of change or testing errors will occur.

5. This procedure can be used for other temperature settings. Those stated are the most popular for whole blood and blood plasma storage.